OMRON

# Code Reader/OCR

Tracing Products Group Catalog

High-accuracy, Multifunctional Readers

LOT. NO. S4153 2013

12packs 2013.01.15

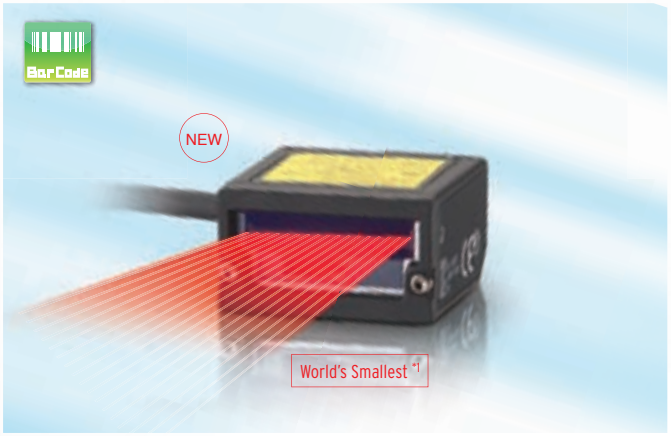
Ultra-compact, High-speed Readers

realizing

# Code Reader

You can select the optimum products from
We provide Readers for everything from Bar Codes and 2D Codes
The lineup also includes Readers that

## Ultra Compact and Fast




### Laser-type Bar Code Reader
### V500-R2 Series

- High speed: 1,000 scans/s
- Long distance: 270 mm
- World's Smallest

▶▶P4

### Multi Code Reader
### V400-R2 Series

- Fastest reading in the class:
  Reads moving objects at up to 500 m/min *2
- Long distance: 125 mm
- Ultra compact

▶▶P8

### Conveyors

・Ultra compact for possible mounting in rail gaps.
・Stable reading of high-speed moving objects.

### Semiconductor Manufacturing Equipment

・World's smallest reader handles 300-mm wafer loading ports.

### Cartoners

・Prevention of mixing of different cartons by reading bar codes.

### Labeler

・Reading to check printing conditions.

*1.According to OMRON investigation in January 2013.
*2.Performance may depend on the code that is read and the printing conditions.

# and OCR Lineup

OMRON's wide lineup of tracing products.
printed on paper or labels to DPM directly printed on workpieces.
can read expiration dates and other text.



High-accuracy and Multifunctional

## Multi Code Reader
### FQ-CR1 Series

- HDR function to cut out ambient light interference.
- Polarizing filter to cut specular reflections.
- Verification with master data.

▶▶P 12

## 2D Code Reader for DPM
### FQ-CR2 Series

- Reads direct part marking codes.
- Cuts halation from metallic surfaces.
- High-power LED that is effective for low contrast.

▶▶P 12

## Optical Character Recognition Sensor
### FQ2-CH Series

- New OCR algorithm.
- Easy application with no dictionary registration.
- Handles dot characters, stamped characters, and more.

▶▶P 16

## Smart Camera
### FQ2-S4 Series

- Code reader, OCR, and inspections.
- Lineup includes Integrated Sensors and C-mounts.
- High resolution of 760,000 or 1,300,000 pixels.

▶▶P 20

## Case Packers

- Lineup of models with many installation distances from 38 to 970 mm.
- Stable reading of low-contrast codes.

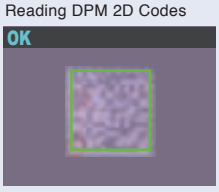
Reading 2D Codes

Reading Bar Codes

## Automotive Processing Machines

- High-performance filters that cut specular reflections from metallic or glossy surfaces.

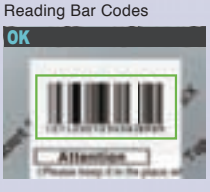
Reading DPM 2D Codes



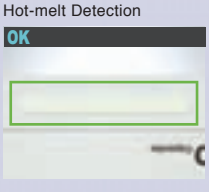
## Cartoners

- Multi-processing of everything needed for cartoners: character verification, code reading, and inspections.

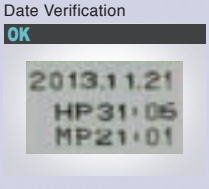
Reading Bar Codes




Hot-melt Detection



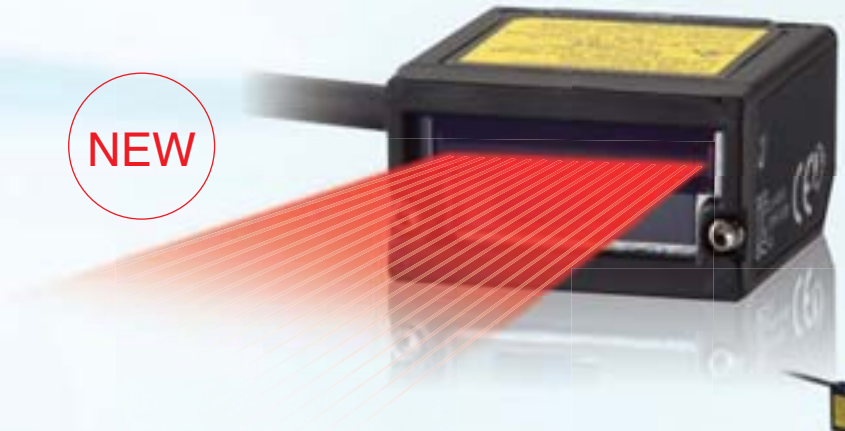

Date Verification

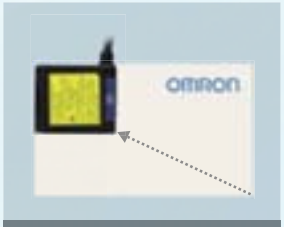


# The World's Smallest* Bar Code Reader That Fits Essentially Anywhere

*According to OMRON investigation in January 2013.

## Laser-type Bar Code Reader
V500-R2 Series



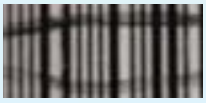
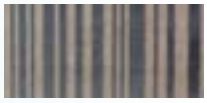
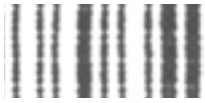

About 1/6th the Size of a Business Card

## High-speed Reading at 1,000 Scans/Second

A high-speed motor and new algorithm gives surprising performance for the size to achieve stable reading even in high-speed takt machines of around 66,000 items/hour.

## Enables Reading Imperfect Codes

Even though it is small, the V500-R2 with its new algorithm is adept at reading even the most imperfect codes. Raster scanning enables reading Bar Codes even if they are partially dirty or missing.

| Dirt | Wear | Blurring | Shiny background | Inconsistent background | Dots |
|---|---|---|---|---|---|
|  | | | |  |  |

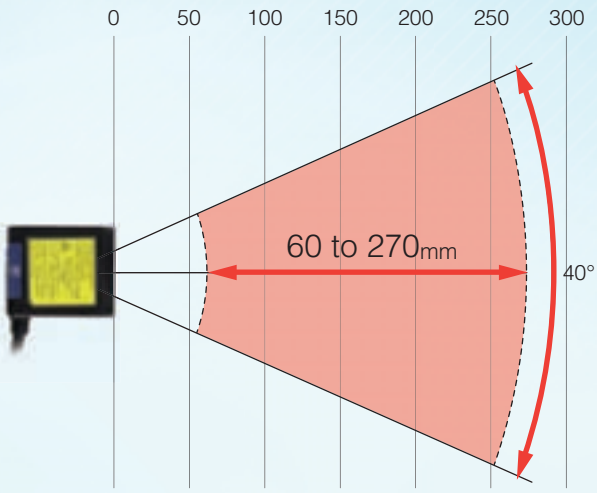
## Resists Ambient Light Interference

Operation is possible with ambient illumination of up to 80,000 lx (sunlight), so the Code Reader can stably read even near Photoelectric Sensors with little influence from ambient light.

| Ambient Light Interference Guidelines | |
|---|---|
| Florescent light | 4,000 lx max. |
| Sunlight | 80,000 lx max. |

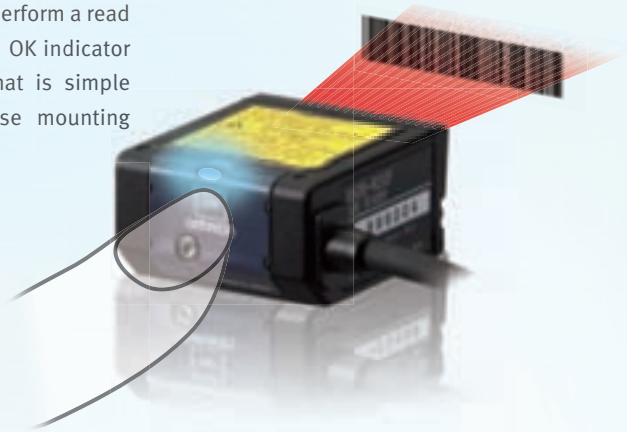
## Long Range Up to 270 mm

The wide reading distance from 60 to 270 mm lets you handle variations in conveying and workpiece height without changing the installation.



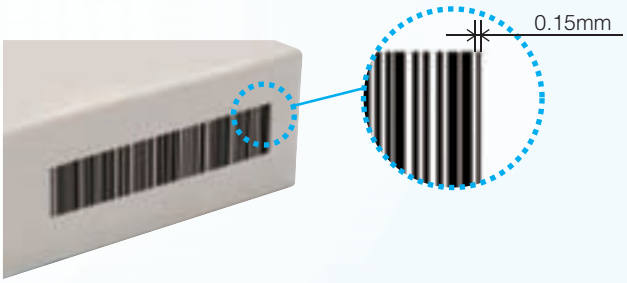

## Reading Test Switch Provided

Just press the Scan button on the Reader to perform a read test. The results are provided with the Read OK indicator and buzzer. We achieved an operation that is simple enough for essentially anyone to increase mounting efficiency.



## Minimum Readable Narrow Bar Width: 0.15 mm

Reading is even possible for Bar Codes with narrow bars of 0.15 mm.

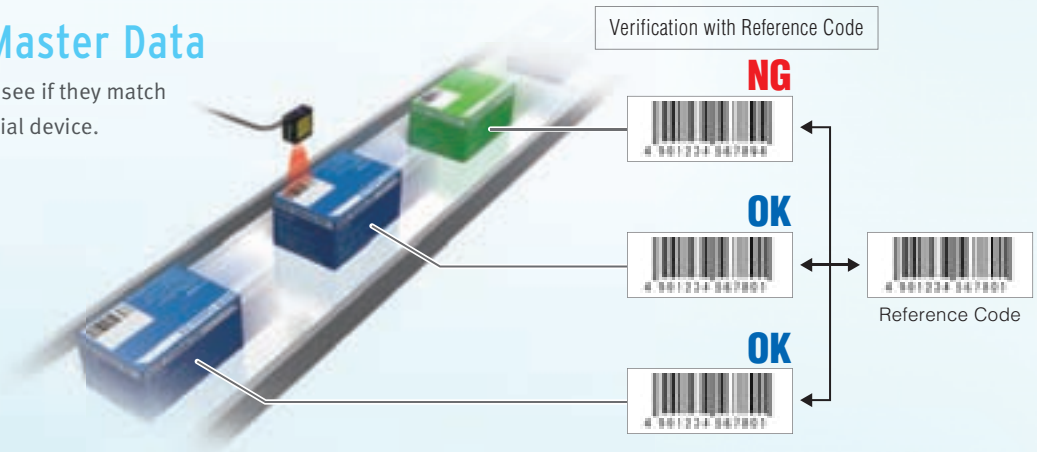



## GS1-Databar (RSS) Supported

The data-rich GS1-Databar (RSS code) Bar Codes can also be read.

## Verification with Master Data

You can verify character strings to see if they match preset master data without a special device.



## Ordering Information

| Type | | Model |
|---|---|---|
| Laser-type Bar Code Reader | | **V500-R2CF** |
| OMRON PLC connecting cable | D-sub 9-pin, 0.8M | **V509-W011** |
| | D-sub 9-pin, 5M | **V509-W016** |
| PC/AT Connecting cable | D-sub 9-pin, 0.8M | **V509-W011D** |
| | D-sub 9-pin, 5M | **V509-W016D** |

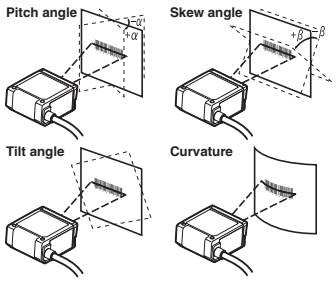
## Ratings and Performance

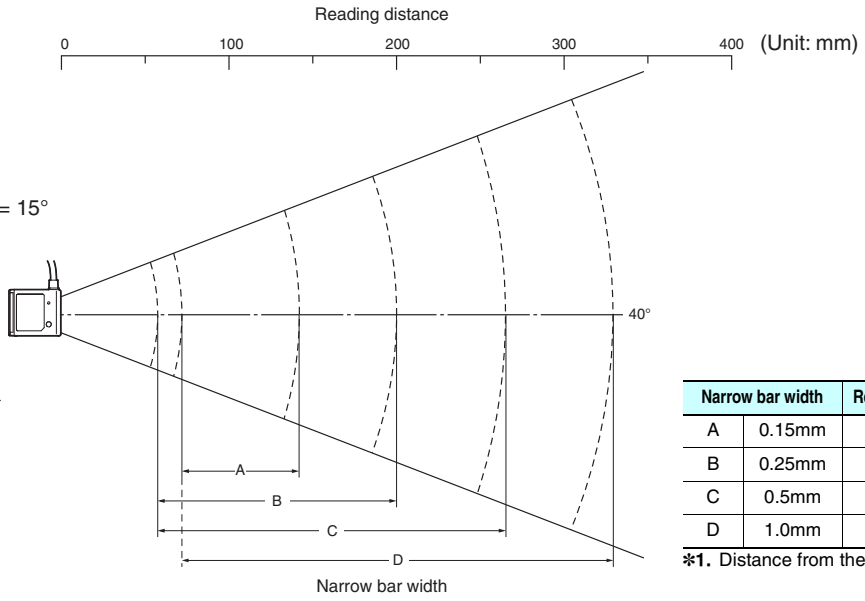
| Model | | V500-R2CF |
|---|---|---|
| **Direction of view** | | Front view |
| **Applicable codes** | **Bar code** | WPC(JAN/EAN/UPC), Codabar(NW-7), ITF, Industrial 2 of 5(STF), Code39, Code93, Code128, GS1-128(EAN-128), GS1-Databar(RSS-14), GS1-Databar Limited(RSS Limited), GS1-Databar Expanded(RSSExpanded) |
| | **Number of reading digits** | No upper limit (depends on bar width and reading distance) |
| **Reading performance(*)** | **Minimum resolution** | Bar code: 0.15 mm |
| | **Contrast (PCS)** | 0.45 or more (white reflectance 70 % or more) |
| | **Reading distance** | 60 to 270 mm (At narrow bar: 0.5 mm) |
| | **Reading angle** | Within 40° (Including margins at left and right sides) |
| | **Pitch angle (α)** | ±30° |
| | **Skew angle (β)** | ±60° (However, exclude from 10° upper side to 8° lower side) |
| | **Tilt angle (γ)** | ±25° |
| | **Reading of bar codes on curved surfaces (R)** | R ≧ 20mm (UPC 12 digit) |
| | **Light source** | Red laser diode (Wave length: 650 nm) |
| | **Light output** | 1.0m W or less (Correspond to JIS class 2) |
| | **Scan type** | Raster scan |
| | **Number of scan** | 1000 scan/sec. |
| **Interface** | **Communication specification** | RS-232C |
| | **OK/NG outputs** | NPN open collector output (cable work required) |
| **Function setting method** | | Menu sheet reading method or host command method |
| **Functional specifications** | **Reading trigger** | External trigger (Transistor input), Trigger by command (RS-232C), Trigger a test reading by pressing the SCAN button on the product |
| | **OK/NG signals** | • When the label is not registered<br>OK signal : ON when reading is successful<br>NG signal : ON when reading fails<br>• When the label is registered<br>OK signal : ON when reading result matches registered label<br>NG signal : ON when reading fails or reading result does not match registered label |
| | **Indication LED** | Read confirmation LED (green) illuminates when reading is successful.<br>Read confirmation LED (red) blinks when motor is in abnormal operation. |
| | **Buzzer** | Notifies a successful reading with a buzzer sound (Muting available) |
| **Power supply specification** | **Power voltage** | 4.5 to 5.5 VDC |
| | **Consumption current** | During operation: 500 mA or less; during standby: 150 mA or less |
| | **Inrush current** | 2.0 A MAX |
| **Environmental specifications** | **Ambient temperature range** | At operation: 0 to + 45°C At storage: -10 to + 60°C |
| | **Ambient humidity range** | At operation and storage: 20 to 85% RH (with no icing or condensation) |
| | **Ambient atmosphere** | No corrosive gases |
| | **Ambient light** | Fluorescent lamp: 4,000lx or less, Sunlight: 80,000lx or less |
| | **Vibration resistance** | 10 to 150 Hz, half amplitude 0.35 mm, 3 directions (X/Y/Z), 8 minutes each 10 times |
| **Degree of protection** | | IP54 (IEC60529) |
| **Weight** | **Main unit only** | Approximately 80 g |
| | **Including accessories** | Approximately 190 g (including mounting bracket, insulation plate and screws) |
| | **Packaged weight** | Approximately 270 g (including packing carton) |
| **Dimensions** | **Main unit** | Approximately 29(W) × 34.5(D) × 17(H)mm |
| | **Packing carton** | Approximately 245(W) × 110(D) × 40(H)mm |
| **Input/output connector** | | Round DIN connector |
| **Code length** | | Approximately 1.5 m |
| **Minimum bending radius of cord** | | Approximately 23 mm |
| **Accessories** | | Operation manual, menu sheet, mounting bracket, insulation plate, M3 × 6 screw (two), M3 × 8 screws (one), M5 × 10 screws (two) |
| **Material, Color** | **Upper case** | Magnesium diecast, black |
| | **Front panel** | PC, black |
| | **Labels** | PET |
| | **Reading window** | PMMA, transparent |
| | **Cable** | Polyvinyl chloride (PVC), black |
| | **Insulation plate** | ABS, black |
| | **Mounting bracket** | SUS304, silver |

✻ Unless otherwise specified, use a JAN x1 , MRD 63% or higher (PCS = 0.9 or higher) bar code with a pitch angle α = 0°, a skew angle β = 15°, a tilt angle γ = 0°, and a curvature R = ∞.

## Reading range performance (typical example)

Explained with examples of following conditions:
- Contrast: MRD 63 % (PCS = 0.9)
- Bar code: CODE39
- Installation condition:
  Pitch angle $\alpha$ = 0°, skew angle $\beta$ = 15°
  Tilt angle $\gamma$ = 0°, curvature R = $\infty$



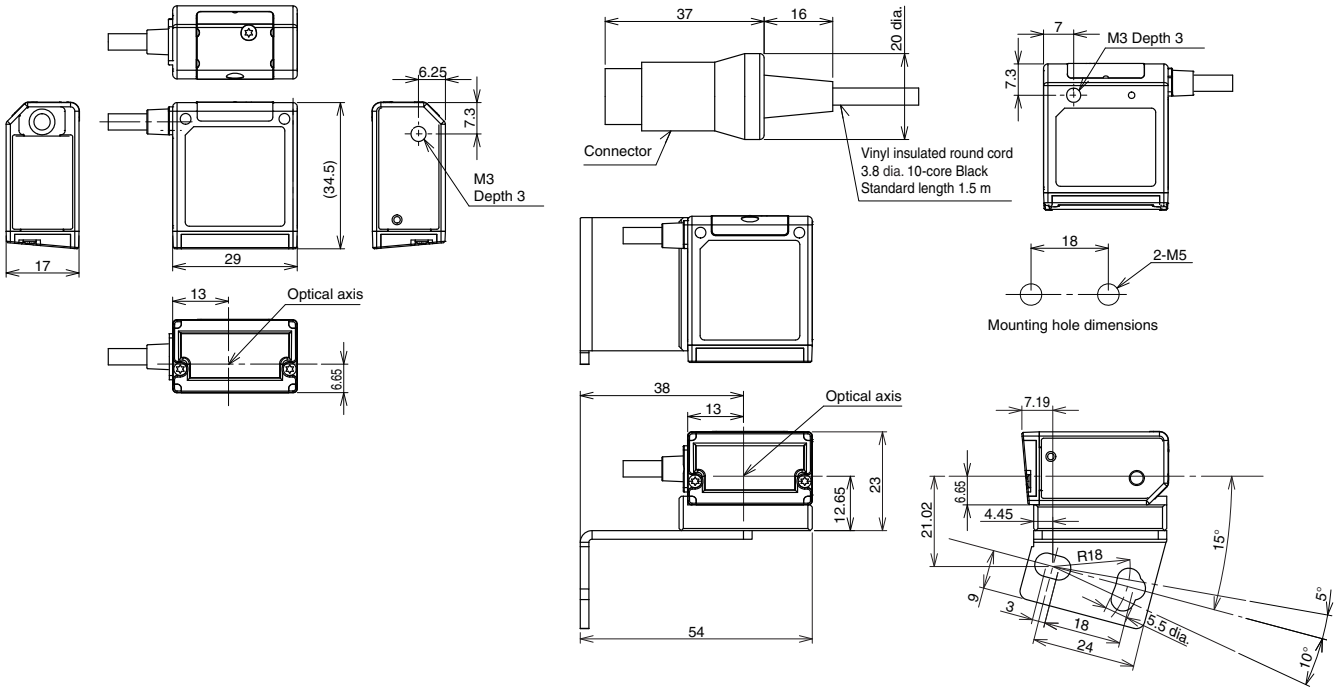

| Narrow bar width | | Reading distance (*1) |
|---|---|---|
| A | 0.15mm | 70 to 140mm |
| B | 0.25mm | 60 to 200mm |
| C | 0.5mm | 60 to 270mm |
| D | 1.0mm | 70 to 330mm |

*1. Distance from the end of the case.

## Dimensions

(Unit: mm)

### Bar Code Reader
### V500-R2CF




### Safety Precautions for Laser Equipment

**⚠ WARNING**

Avoid eye exposure to direct or scattered radiation reflected by a mirror surface.
Laser beam emitted from a laser has high power density and may become blind when the beam is directed into eyes.

**Laser Label Indications**

This warning label is attached to the Bar Code Reader.
Never remove this label or place objects in front of it.

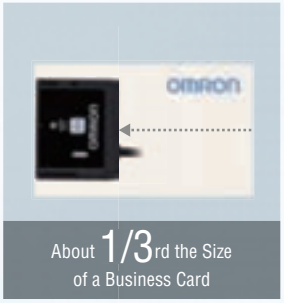
## Related Manuals

| Man.No. | Model number | Manual |
|---|---|---|
| Z334 | V500-R2 | Laser-Type Bar Code Reader V500-R2 Series User's Manual |

# The Ultra-small Multi-code Reader That Can Handle Speed

## Multi Code Reader
V400-R2 Series

NEW




## Improves Machine Takt Time with the Fastest Reading in the Class: Reads Moving Objects at Up to 500 m/min*

It is not just the size that makes this Reader easy to build into equipment. It enables stable reading of moving objects on high-speed lines. Build it into equipment to read moving objects, which is achieved with a new algorithm.

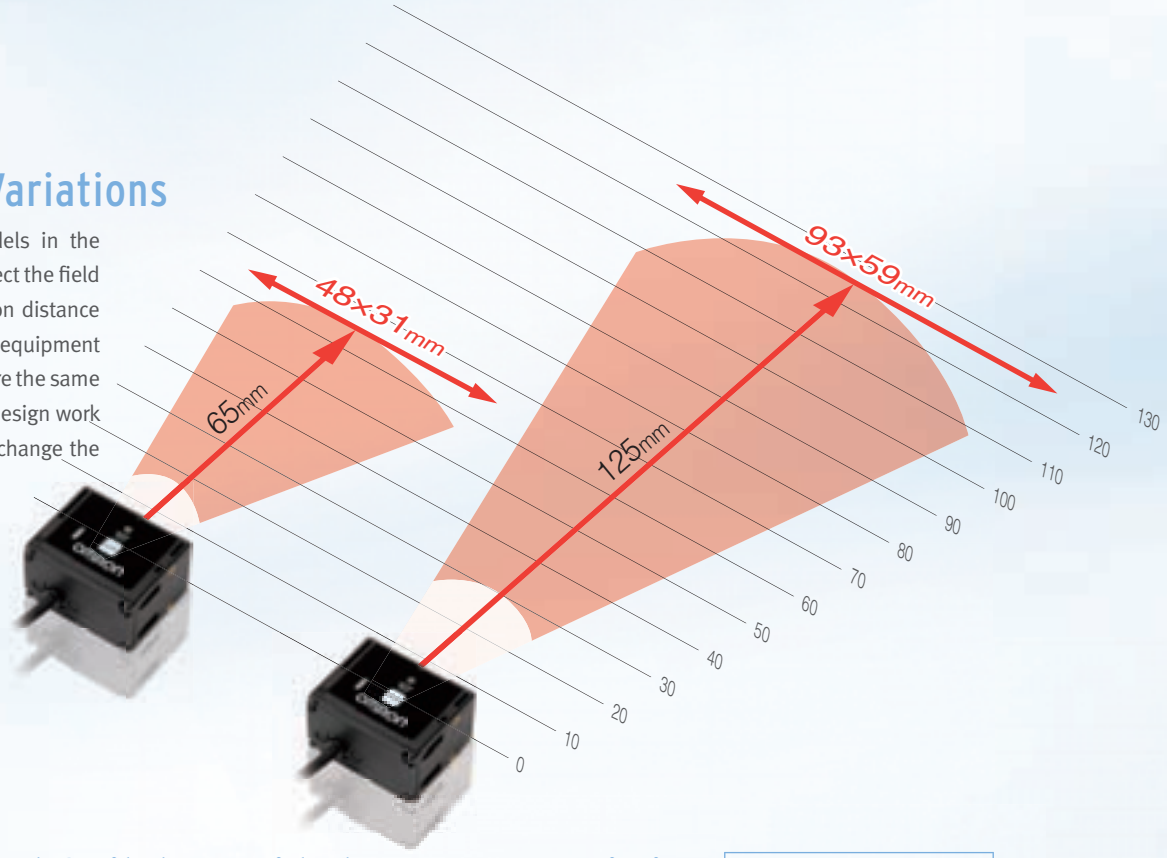
* Performance may depend on the code that is read and the printing conditions.

## Stable Reading of Imperfect Codes

The V400-R2 with its new algorithm is adept even the most imperfect codes. Even for codes that were previously difficult to read, you can change the exposure time and gain to achieve the optimum settings to enable reading.

## Distance Variations

There are two models in the lineup to let you select the field of view or installation distance that is best for the equipment type. Both models are the same size, so additional design work is not necessary to change the model.

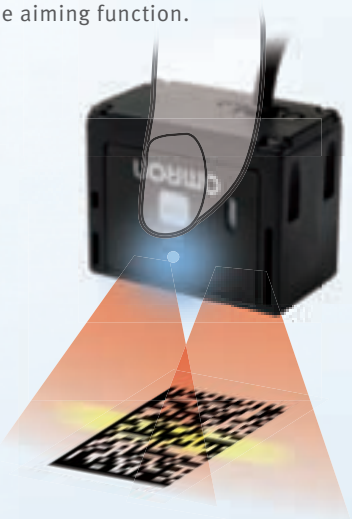



## Reading Test Switch Provided

We achieved an operation that is simple enough for essentially anyone. Just press the Scan button on the Reader to perform a read test. The results are provided with the Read OK indicator and buzzer.

## Aiming Positioning Function

A guide light lets you easily find the ideal installation position. You can easily and quickly position the codes with the aiming function.



## Body Resists Environments to IP65

IP65 protection is provided because that is generally the level that is required to build devices into equipment. That enables reliable application in harsh environments subject to water and mist.

## GS1-Databar (RSS) Supported

The data-rich GS1-Databar (RSS code) Bar Codes can also be read. This enables reliable applications in the pharmaceutical industry, where GS1-Databar (RSS code) Bar Codes are becoming popular.

## Verification with Master Data

You can verify character strings to see if they match preset master data without a special device.

## Ordering Information

| Type | | Model |
|---|---|---|
| Multi Code Reader | Working distance 65mm | **V400-R2CF65** |
| | Working distance 125mm | **V400-R2CF125** |
| OMRON PLC connecting cable | D-sub 9-pin, 0.8M | **V509-W011** |
| | D-sub 9-pin, 5M | **V509-W016** |
| PC/AT Connecting cable | D-sub 9-pin, 0.8M | **V509-W011D** |
| | D-sub 9-pin, 5M | **V509-W016D** |

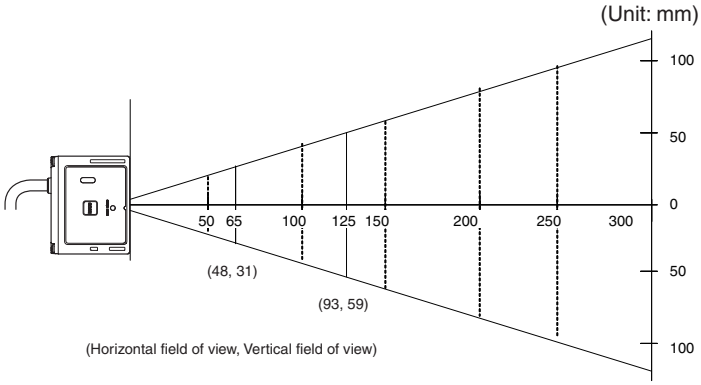
## Ratings and Performance

| Model | | V400-R2CF65 | V400-R2CF125 |
|---|---|---|---|
| **Direction of view** | | Front view | |
| **Applicable codes ✻1** | **Bar code** | WPC(JAN/EAN/UPC), Codabar(NW-7), ITF, Industrial 2 of 5(STF), Code39, Code93, Code128, GS1-128(EAN-128), GS1-Databar(RSS-14), GS1-Databar Limited(RSS Limited), GS1-Databar Expanded(RSS Expanded), GS1-Databar Composite(RSS Composite) | |
| | **2D code** | QR code, DataMatrix(ECC200), MicroQR code, PDF417, AztecCode, MaxiCode, Codablock-F | |
| **Reading performance ✻2** | **Number of reading digits** | No upper limit (depends on bar width and reading distance) | |
| | **Light source** | Two red LEDs (wave length: 617 nm) | |
| | **Aiming light** | One green LED (wave length: 528 nm) | |
| | **Minimum resolution** | Bar code: 0.076 mm<br>2D code: 0.127 mm | Bar code: 0.127 mm<br>2D code: 0.212 mm |
| | **Image capture device** | Monochrome CMOS | |
| | **Effective number of pixels** | 754 × 480 pixels | |
| | **Working distance (WD)** | 65mm | 125mm |
| | **Field of view** | Approximately 48 × 31(for WD = 65 mm) | Approximately 93 × 59(for WD = 125 mm) |
| | **Pitch angle (α)** | ±50° | |
| | **Skew angle (β)** | ±50° | |
| | **Tilt angle (γ)** | ±180° | |
| | **Reading of bar codes on curved surfaces (R)** | R ≧20mm (UPC 12 line) | |
| **Interface** | **Communication specification** | RS-232C | |
| | **OK/NG outputs** | NPN open collector output (cable work required) | |
| **Function setting method** | | Menu sheet reading, Sending commands from upper equipment, or SCAN button (only when executing code condition teaching) | |
| **Functional specifications** | **Reading trigger** | External trigger (Transistor input)<br>Trigger by command (RS-232C)<br>Trigger a test reading by pressing the SCAN button on the product | |
| | **OK/NG signals** | • When the label is not registered<br>OK signal: ON when reading is successful<br>NG signal: Not used<br>• When the label is registered<br>OK signal: ON when reading result matches registered label<br>NG signal: ON when reading result does not match registered label | |
| | **Indication LED** | • When reading<br>Read confirmation LED (green) illuminates when reading is successful.<br>• When teaching<br>Read confirmation LED (green) blinks during execution.<br>When teaching is successful, read confirmation LED (green) illuminates and buzzer sounds.<br>When teaching fails, read confirmation LED (red) illuminates and BAD buzzer sounds. ✻3 | |
| | **Buzzer** | Notifies a successful reading with a buzzer sound (Muting available) | |
| **Power supply specification** | **Power voltage** | 4.5 to 5.5 VDC | |
| | **Consumption current** | During operation: 265 mA or less; during standby: 70 mA or less | |
| **Environmental specifications** | **Ambient temperature range** | At operation: 0 to + 45°C; At storage: -10 to + 60°C | |
| | **Ambient humidity range** | At operation and storage: 20 to 85% RH (with no icing or condensation) | |
| | **Ambient atmosphere** | No corrosive gases | |
| | **Ambient light** | Fluorescent lamp: 10,000lx or less, Sunlight: 100,000lx or less | |
| | **Vibration resistance** | 10 to 150 Hz, half amplitude 0.35 mm, 3 directions (X/Y/Z), 8 minutes each 10 times | |
| **Degree of protection** | | IP65 (IEC60529) | |
| **Weight** | **Main unit only** | Approximately 90 g | |
| | **Including accessories** | Approximately 200 g (including mounting bracket and screws) | |
| | **Packaged weight** | Approximately 280 g (including packing carton) | |
| **Dimensions** | **Main unit** | Approximately 41(W) × 33(D) × 24(H) mm | |
| | **Packing carton** | Approximately 240(W) × 110(D) × 40(H) mm | |
| **Input/output connector** | | Round DIN connector | |
| **Code length** | | Approximately 1.5 m | |
| **Minimum bending radius of cord** | | Approximately 23 mm | |
| **Accessories** | | Operation manual, menu sheet, mounting bracket, M2 × 6 screws (two), M5 ×10 screws (two) | |
| **Material, Color** | **Case** | PC, PET, black | |
| | **Reading window** | PMMA, transparent | |
| | **Cable** | Polyvinyl chloride (PVC), black | |
| | **Mounting bracket** | SUS304, silver | |

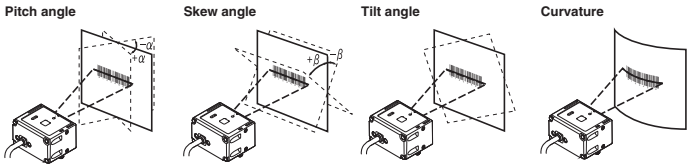
**✻1.** These are the code types supported based on Omron's read capability validation standard. It is recommended that the customer do its own validation in its actual work environment.
**✻2.** Unless otherwise specified, the reading performance is defined with angle α = 0°, β = +15°, γ = 0°, R = ∞; illuminance:100 to 2001x, reading rate: 90% or more.
**✻3.** The BAD buzzer is two low-pitched buzz sounds.

•QR code is the registered trademark of DENSO WAVE.

# Reading range performance (typical example)




Explained with examples of following conditions:
•Contrast: MRD 63% (PCS = 0.9)
•Installation condition:
Pitch angle $\alpha$ = 0°, skew angle $\beta$ = 15°
Tilt angle $\gamma$ = 0°, curvature R = $\infty$
•Reading rate: 90% or more in 10 tries




**V400-R2CF125**
**2D code (typical example)**

| Code types | Resolution | Reading distance | Field-of-view size at reading distance |
|---|---|---|---|
| QR Code | 0.212 | 95 to 115 | 70×44 to 85×54 |
| | 0.381 | 60 to 185 | 44×28 to 137×87 |
| Data Matrix | 0.254 | 80 to 145 | 59×38 to 107×68 |
| PDF417 | 0.169 | 85 to 130 | 63×40 to 96×61 |
| | 0.254 | 65 to 180 | 48×30 to 133×85 |

**Bar code (typical example)**

| Code types | Resolution | Reading distance | Field-of-view size at reading distance |
|---|---|---|---|
| Code39 | 0.127 | 90 to 125 | 66×42 to 93×59 |
| | 0.254 | 70 to 190 | 52×33 to 141×89 |
| | 0.508 | 65 to 235 | 48×30 to 174×110 |
| Code128 | 0.2 | 80 to 160 | 59×38 to 118×75 |
| UPC | 0.33 | 55 to 185 | 40×25 to 137×87 |

**V400-R2CF65**
**2D code (typical example)**

| Code types | Resolution | Reading distance | Field-of-view size at reading distance |
|---|---|---|---|
| QR Code | 0.169 | 70 to 80 | 51×33 to 59×38 |
| | 0.381 | 45 to 110 | 33×21 to 81×52 |
| Data Matrix | 0.212 | 65 to 90 | 48×31 to 66×42 |
| PDF417 | 0.127 | 65 to 80 | 48×31 to 59×38 |
| | 0.254 | 65 to 110 | 48×31 to 81×52 |

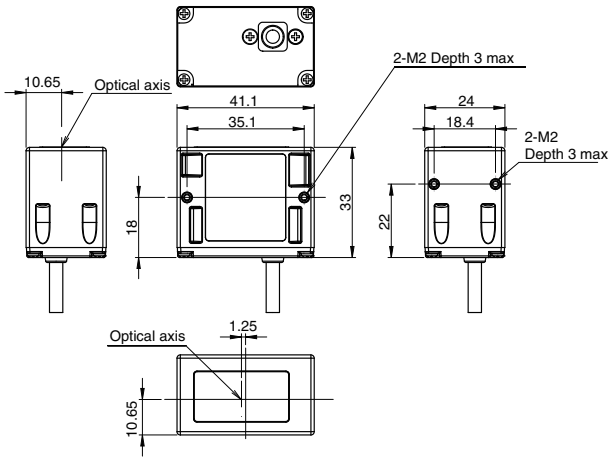
**Bar code (typical example)**

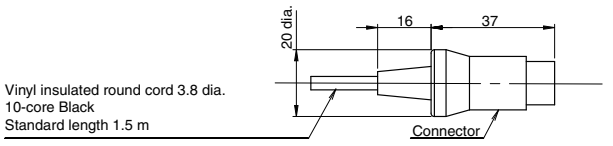
| Code types | Resolution | Reading distance | Field-of-view size at reading distance |
|---|---|---|---|
| Code39 | 0.127 | 65 to 85 | 48×31 to 62×40 |
| | 0.254 | 60 to 110 | 44×28 to 81×52 |
| Code128 | 0.18 | 55 to 100 | 40×26 to 74×47 |
| UPC | 0.33 | 60 to 125 | 44×28 to 92×58 |

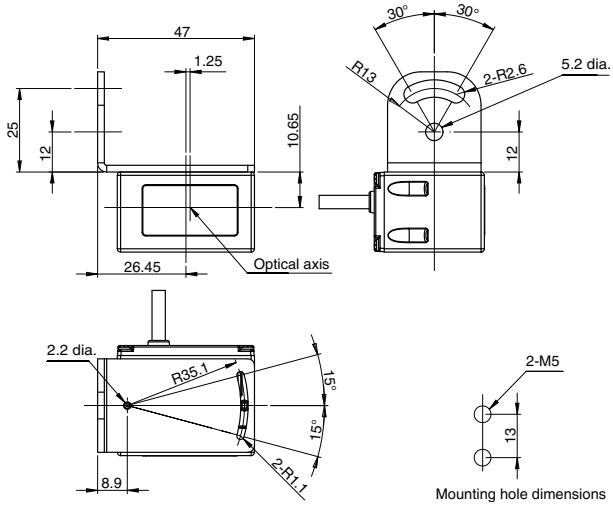
# Dimensions

**(Unit: mm)**

**Multi Code Reader**
**V400-R2CF65/R2CF125**




# Related Manuals

| Man.No. | Model number | Manual |
|---|---|---|
| Z333 | V400-R2 | Multi Code Reader V400-R2 Series User's Manual |

**Multi Code Reader** FQ-CR1 series

**2D Code Reader for DPM** FQ-CR2 series

# Highly Advanced, Multi-functional Code Reader That Can Handle Low-contrast and Glossy Surfaces

## Multi Code Reader
FQ-CR1 Series

## 2D Code Reader for Direct Part Marking codes
FQ-CR2 Series

FQ-CR1 | FQ-CR2

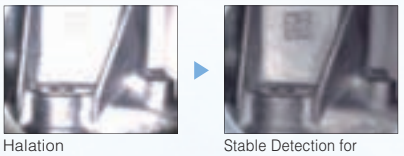
## High-power LEDs

The wider the field of view, the more difficult it is to maintain consistent lighting within the field, causing errors in reading. The built-in LEDs of the FQ-CR Series use a unique OMRON DR optical system for effective light usage to maintain consistent lighting within the field of view at a brightness that is four times that of previous models.

Previous Lighting | High-power Lighting

## HDR Function to Cut Out Ambient Light Interference

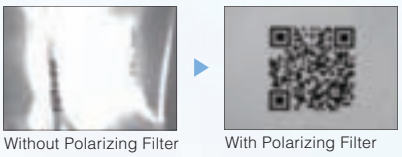
The HDR (high dynamic range) function minimizes the influence of changes in lighting conditions and light reflection. This enables stable inspections even for materials that are difficult to light evenly, such as metal parts or glossy films, or in locations subject to external light interference.



Halation | Stable Detection for Metal Surfaces Subject to Gloss and Inconsistent Lighting

## Polarizing Filter to Cut Specular Reflections

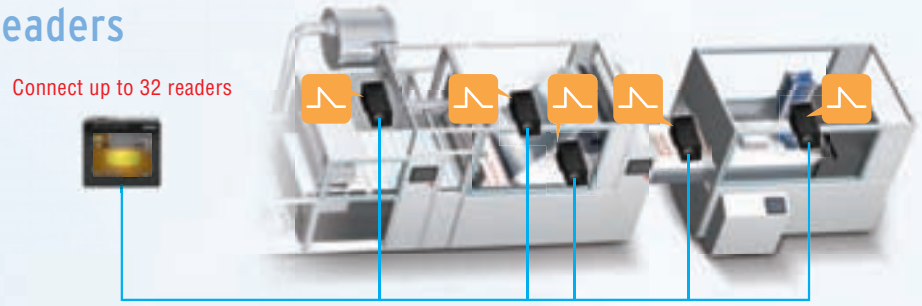
A polarizing filter is included to cut specular reflection from glossy surfaces. This enables stable code reading even for metallic or other glossy surfaces.



Without Polarizing Filter | With Polarizing Filter

## Connection of Up to 32 Readers

Up to 32 Code Readers can be controlled from the Touch Finder setup console. Expansion of required processes is simple.



FQ-CR2

## Removing Printing Irregularities or Noise

You can apply up to three of the four unique filters developed by OMRON in the desired order to remove printing irregularities and noise, in order to achieve a stable reading.

Combining Filtering

Erosion and dilation can be combined to connect dots without changing the dot thickness.

Types of Filtering

| | | | |
|---|---|---|---|
| Smooth | Smooths the image. | Erosion | For white codes, reduces the cell size. Effective for reading separated dot codes. |
| Dilate | For white codes, increases the cell size. Effective for reading codes with cell spreading. | Median | Removes noise. |

## Retry Reading Until Successful

Code Readers must be able to read codes even for poor printing conditions. You can automatically retry reading while changing the exposure time and other reading conditions, even for changing workpieces or environments, to enable a stable reading.

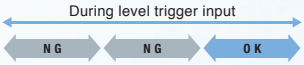
The following retry functions are provided.

1 **Retrying the Specified Number of Times with the Same Conditions**

Reading is performed the specified number of times for the same scene.

2 **Retrying While External Trigger Is Input**

Reading is performed until successful, as long as an external level trigger is input.




3 **Retrying While Changing the Shutter Speed**

Reading is performed for the same scene while changing the exposure time in stages.

4 **Retrying While Changing the Reading Conditions**

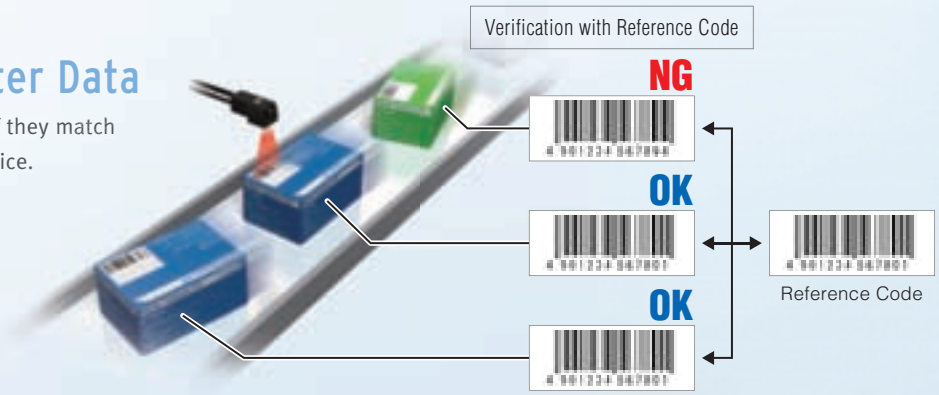
When reading DPM codes, inconsistencies in printing conditions can result in NGs if reading is performed with only one set of reading settings. The FQ-CR allows you to register up to 32 sets of reading conditions as scenes and retry reading while changing the scenes in order. The system automatically determines the scenes with the highest usage rates and changes the order to start with them to flexibly handle changes in reading conditions. Of course you can specify a fixed order if required.

Register 32 sets of reading conditions.
Rapidly switch to the optimum reading conditions.

FQ-CR1

## Verification with Master Data

You can verify character strings to see if they match preset master data without a special device.

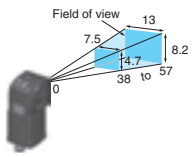


# Ordering Information

## Code Reader

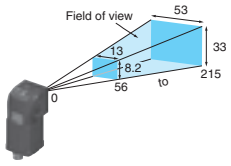
(Unit: mm)

### Narrow View



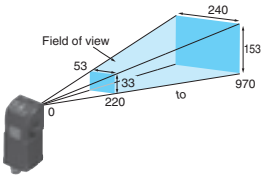

| | 2D CodeReader | Multi Code Reader |
|---|---|---|
| NPN | **FQ-CR20010F-M** | **FQ-CR10010F-M** |
| PNP | **FQ-CR25010F-M** | **FQ-CR15010F-M** |

### Standard



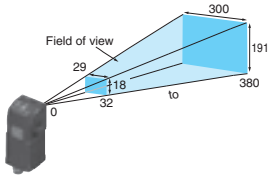

| | 2D CodeReader | Multi Code Reader |
|---|---|---|
| NPN | **FQ-CR20050F-M** | **FQ-CR10050F-M** |
| PNP | **FQ-CR25050F-M** | **FQ-CR15050F-M** |

### Wide View(Long-distance)




| | 2D CodeReader | Multi Code Reader |
|---|---|---|
| NPN | **FQ-CR20100F-M** | **FQ-CR10100F-M** |
| PNP | **FQ-CR25100F-M** | **FQ-CR15100F-M** |

### (Short-distance)




| | 2D CodeReader | Multi Code Reader |
|---|---|---|
| NPN | **FQ-CR20100N-M** | **FQ-CR10100N-M** |
| PNP | **FQ-CR25100N-M** | **FQ-CR15100N-M** |

**Note:** Tolerance (field of view): ±10% max.

## Touch Finder

| Type | Model |
|---|---|
| DC power supply | **FQ2-D30** |
| AC/DC/battery | **FQ2-D31** |

Refer to the FQ2 Smart Camera Catalog (Cat. No. Q193) for other devices.

## Cables

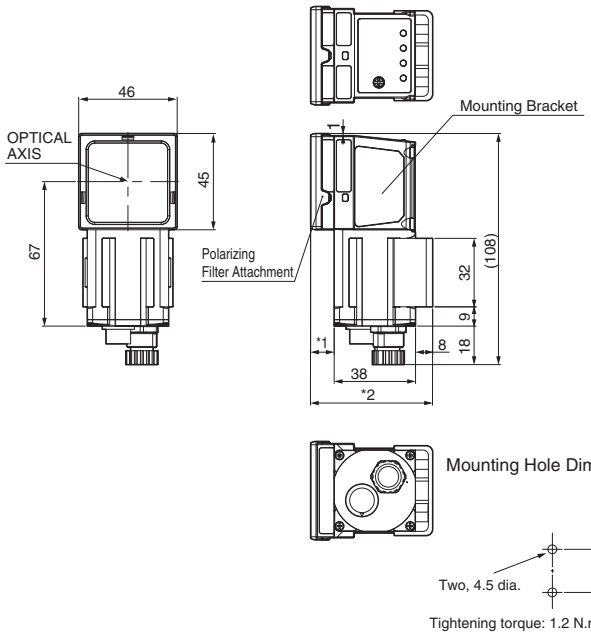
| Type | Cable length | Model |
|---|---|---|
| FQ Ethernet Cables (connect Sensor to Touch Finder, Sensor to PC) | 2m | **FQ-WN002** |
| | 5m | **FQ-WN005** |
| | 10m | **FQ-WN010** |
| | 20m | **FQ-WN020** |
| I/O Cables | 2m | **FQ-WD002** |
| | 5m | **FQ-WD005** |
| | 10m | **FQ-WD010** |
| | 20m | **FQ-WD020** |

# Dimensions

(Unit: mm)

## Code Reader

### FQ-CR




| Type | Model | Note 1. | Note 2. |
|---|---|---|---|
| **Narrow View, Standard** | FQ-CR1□010F-M/-CR2□010F-M/ -CR1□050F-M/-CR2□050F-M | 11 | 57 |
| **Wide View** | FQ-CR1□100F-M/-CR2□0100F-M/ -CR1□100N-M/-CR2□100N-M | 3 | 49 |

# Ratings and Performance

## Code Reader

| Item | Type | 2D Code Reader | Multi Code Reader |
|---|---|---|---|
| Model | NPN | FQ-CR20□□□□-M | FQ-CR10□□□□-M |
| | PNP | FQ-CR25□□□□-M | FQ-CR15□□□□-M |
| Field of view | | Refer to Ordering Information on p.14 (Tolerance (field of view): ±10% max.) | |
| Installation distance | | | |
| Minimum resolution | | FQ-CR2□010F-M/-CR1□010F-M: 0.040mm FQ-CR2□050F-M/-CR1□050F-M: 0.070mm<br>FQ-CR2□100F-M/-CR1□100F-M: 0.282mm FQ-CR2□100N-M/-CR1□100N-M: 0.155mm | |
| Main functions | Code | 2D Code (DataMatrix (EC200), QR Code) | 2D Code (DataMatrix (EC200), QR Code, MicroQR Code, PDF417, MicroPDF417, GS1-Data Matrix |
| | | | Bar code (JAN/EAN/UPC, Code39, Codabar (NW-7), ITF (Interleaved 2 of 5), Code 93, Code128/GS1-128, GS1 DataBar* (Truncated, Stacked, Omni-directional, Stacked Omni-directional, Limited, Expanded and Expanded Stacked), Pharmacode and GS1-128 Composite Code (CC-A, CC-B, CC-C)) |
| | Image filter | Filter function (Smooth, Dilate, Erosion, Median), Retry function, Code Error Correction Position Display | None |
| | Verification function | None | Supported |
| | Number of simultaneous inspections | 32 | |
| | Number of registered scenes | 32 | |
| Image input | Image filter | High dynamic range (HDR), polarizing filter (attachment) | |
| | Image elements | 1/3-inch monochrome CMOS | |
| | Shutter | 1/250 to 1/32,258 s | 1/250 to 1/30,000 s |
| | Processing resolution | 752 × 480 | |
| Lighting | Lighting method | Pulse | |
| | Lighting color | White | |
| Data logging | Measurement data | In Code Reader:1,000 items (If a Touch Finder is used, results can be saved up to the capacity of an SD card.) | |
| | Images | In Code Reader:20 images (If a Touch Finder is used, images can be saved up to the capacity of an SD card.) | |
| Measurement trigger | | External trigger (single or continuous), Communications trigger (Ethernet TCP no-protocol) | |
| I/O specifications | Input signals | 7 signals<br>• Single measurement input (TRIG)<br>• Control command inputs (IN0 to IN5) | |
| | Output signals | 3 signals<br>• Control output (BUSY)<br>• Overall judgement output (OR)<br>• Error output (ERROR)<br>**Note:** The three output signals can be allocated for the judgements of individual inspection items. | |
| | Ethernet specification | 100BASE-TX/10BASE-T | |
| | Communications | Ethernet TCP no-protocol | |
| Ratings | Power supply voltage | 21.6 to 26.4 VDC (including ripple) | |
| | Current consumption | 2.4 A max. | |
| Environmental immunity | Ambient temperature range | Operating: 0 to 50°C<br>Storage: −25 to 65°C<br>(with no icing or condensation) | |
| | Ambient humidity range | Operating and storage: 35% to 85% (with no condensation) | |
| | Ambient atmosphere | No corrosive gas | |
| | Vibration resistance (destruction) | 10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times | |
| | Shock resistance (destruction) | 150 m/s$^2$ 3 times each in 6 direction (up, down, right, left, forward, and backward) Degree of protection | |
| | Degree of protection | IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted.) | |
| Materials | | Code Reader: PBT, PC, SUS<br>Mounting Bracket: PBT<br>Polarizing Filter Attachment: PBT, PC<br>Ethernet connector: Oil-resistance vinyl compound<br>I/O connector: Lead-free heat-resistant PVC | |
| Weight | | Narrow View/Standard View:Approx.160 g Wide View:Approx.150 g | |
| Accessories | | • Mounting Bracket (FQ-XL) (1)<br>• Polarizing Filter Attachment (FQ-XF1) (1)<br>• Instruction Manual<br>• Member registration sheet | |
| LED class | | Risk Group 2 (IEC62471-2) | |
| Applicable standards | | EC Directive No.2004/108/EC and EN standard EN 61326-1 | |

## Related Manuals

| Man.No. | Model number | Manual |
|---|---|---|
| Z329 | FQ-CR1-M | Fixed Mount Multi Code Reader FQ-CR1-M User's manual |
| Z316 | FQ-CR2-M | Fixed Mount 2D Code Reader FQ-CR2-M User's manual |

# An OCR Sensor with Built-in Dictionary for Reading Expiration Dates and Lot Numbers

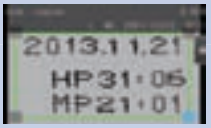
## Optical Character Recognition Sensor
FQ-CH Series

## Approx. 80 Built-in Fonts

The large amount of data in the built-in dictionary contains approximately 80 different fonts that are used on FA sites.Variations for worn characters, blurring, distortion, different backgrounds, and size changes have been included to enable stable and highly accurate reading with the built-in dictionary even for some variations in the characters.It is not necessary to set parameters to compensate for character contrast or positional offsetting.

Time is required for character registration in the dictionary.

① Draw boxes around characters.

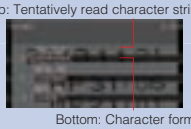



Up to four lines can be read. The following characters can be read.

- Letters of the alphabet: A to Z (uppercase)
- Numbers: 0 to 9
- Symbols: ' - . : /

② Set the character formats.

Top: Tentatively read character string



Bottom: Character format

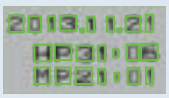
The character format is displayed from the read results. Set the character format according the format of the characters to read.

- Letter: $
- Number: #
- Symbol: @
- Not read: *
- Number or letter: ?

③ Press the TEACH Button.

The character extraction conditions are automatically adjusted according to the conditions of the printed characters.

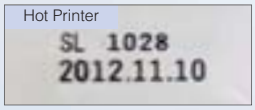
Reading is started.




Different printers use different printing devices.

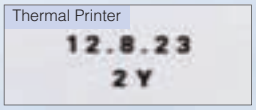
Characters from most printers can be read, including dot and impact printers. Handles Approx. 80 Fonts

Hot Printer

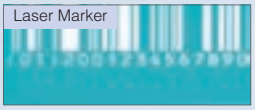



Inkjet Printer

Thermal Printer



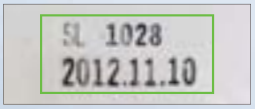

Laser Marker



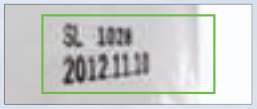
Worn and inclined characters cannot be read.

Unique recognition technology enables stable recognition of worn or distorted characters.

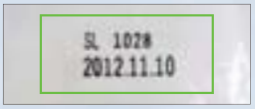
Worn Characters




Inclined Characters




Small Characters



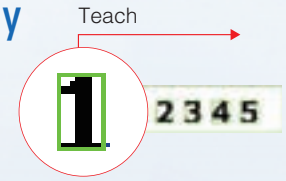
# Utilities That Make Everyday Operation Easier

## Verification to Reduce Setup Work

You can verify the read character data against the character data registered in the master data. Master data registration is easy. A character string is read and the result is registered in the master data. This reduces setting time and mistakes in setting character strings. You can register up to 32 character strings in the master data and easily change the current master data with an external signal.

## Registration in Model Dictionary

You can add characters to the dictionary. You can achieve reliable operation when reading special fonts even if reading was not stable with the default settings.




Registered

## Logging Images and Reading Data

The read images and reading results can be temporarily saved in the sensor, and up to 10,000 images and 10,000,000 reading results can be saved in a 4-GB SD card. You can select logging both OK and NG results or only NG results to aid in traceability.

Sensor

Images: 20
Reading results: 1,000 max.

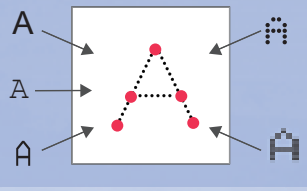
Touch Finder

Images: Approx. 10,000
Reading results: Approx. 10,000,000 (with 4-GB SD card)

## New OCR Algorithm: Matching with Structural Models

Even in cases like the following one, where character registration is required for image matching methods, no character registration is required to read the characters with this new method, which matches structural models of characteristic points.

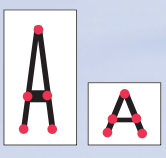
Structural models record the characteristics of each character in approximately 80 fonts.



The position and structure of characteristic points are used to recognize characters.

Background Changes

Size and Font Changes



Worn Characters

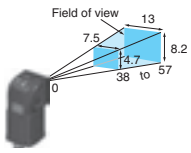
Inclined Characters

# Ordering Information

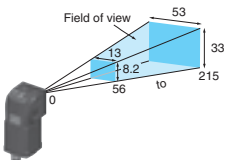
## Optical Character Recognition Sensor

(Unit: mm)

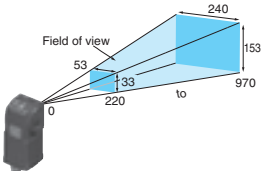
Narrow View



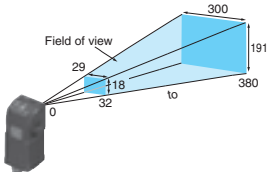

Standard




Wide View(Long-distance)




(Short-distance)




| Field of view | | Narrow View | Standard View | Wide View (Long-distance) | Wide View (Short-distance) |
|---|---|---|---|---|---|
| Monochrome | NPN | **FQ2-CH10010F-M** | **FQ2-CH10050F-M** | **FQ2-CH10100F-M** | **FQ2-CH10100N-M** |
| | PNP | **FQ2-CH15010F-M** | **FQ2-CH15050F-M** | **FQ2-CH15100F-M** | **FQ2-CH15100N-M** |

## Touch Finder

| Type | Model |
|---|---|
| DC power supply | **FQ2-D30** |
| AC/DC/battery | **FQ2-D31** |

Refer to the FQ2 Smart Camera Catalog (Cat. No. Q193) for other devices.

## Cables

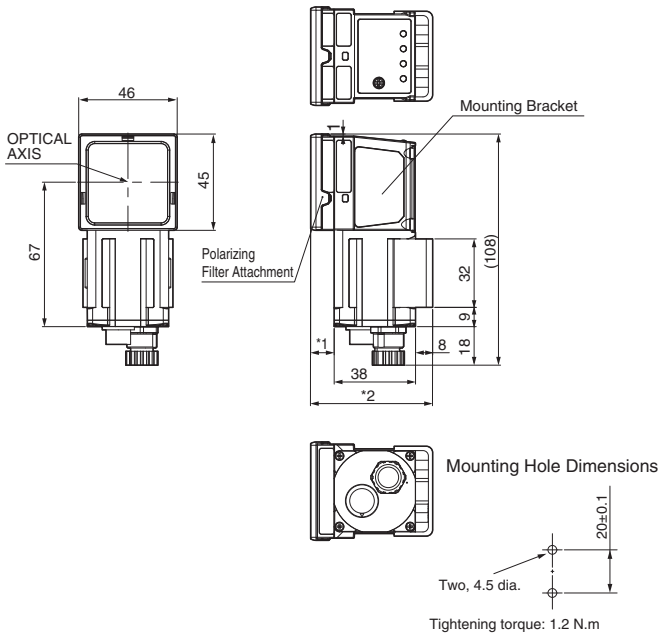
| Type | Cable length | Model |
|---|---|---|
| FQ Ethernet Cables (connect Sensor to Touch Finder, Sensor to PC) | 2m | **FQ-WN002** |
| | 5m | **FQ-WN005** |
| | 10m | **FQ-WN010** |
| | 20m | **FQ-WN020** |
| I/O Cables | 2m | **FQ-WD002** |
| | 5m | **FQ-WD005** |
| | 10m | **FQ-WD010** |
| | 20m | **FQ-WD020** |

# Dimensions

(Unit: mm)

## Optical Character Recognition Sensor

**FQ2-CH**




| Type | Model | Note 1. | Note 2. |
|---|---|---|---|
| **Narrow View, Standard** | FQ2-CH1□010F-M/-CH1□050F-M | 11 | 57 |
| **Wide View** | FQ2-CH1□100F-M/-CH1□100N-M | 3 | 49 |

# Ratings and Performance

| Item | | Optical Character Recognition Sensor |
|---|---|---|
| Model | NPN | FQ2-CH10□□□□-M |
| | PNP | FQ2-CH15□□□□-M |
| Field of view | | Refer to Ordering Information on p.18. (Tolerance (field of view): ±10% max.) |
| Installation distance | | |
| Main functions | Inspection items | OCR<br>• Alphabet A to Z<br>• Number 0 to 9<br>• Symbol ' - . : /<br>Model dictionary |
| | Image filter | Weak smoothing, Strong smoothing, Dilate, Erosion, Median, Extract edges, Extract horizontal edges, Extract vertical edges, Enhance edges, Background suppression |
| | Verification function | Supported |
| | Retry function | Normal retry, Exposure retry, Scene retry, Trigger retry |
| | Number of simultaneous measurements | 32 |
| | Position compensation | Supported (360° Model position compensation, Edge position compensation, Linear correction) |
| | Number of registered scenes | 32 |
| Image input | Image processing method | Monochrome |
| | Image filter | High dynamic range (HDR) and polarizing filter (attachment) |
| | Image elements | 1/3-inch Monochrome CMOS |
| | Shutter | Built-in lighting ON: 1/250 to 1/50,000 s<br>Built-in lighting OFF: 1/1 to 1/50,000 s |
| | Processing resolution | 752 × 480 |
| | Partial input function | Supported horizontally only |
| | Image display | Zoom-in/Zoom-out/Fit, Rotating by 180° |
| Lighting | Lighting method | Pulse |
| | Lighting color | White |
| Data logging | Measurement data | In Sensor: 1,000 items (If a Touch Finder is used, results can be saved up to the capacity of an SD card.) |
| | Images | In Sensor: 20 images (If a Touch Finder is used, images can be saved up to the capacity of an SD card.) |
| Auxiliary function | | Statistical data, Test Measurements, I/O monitor, Password function, Simulation software, Sensor error history, Calibration, Math (arithmetic, calculation functions, trigonometric functions, and logic functions) |
| Measurement trigger | | External trigger (single or continuous)<br>Communications trigger (Ethernet TCP no-protocol, Ethernet UDP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, PLC Link, or PROFINET) |
| I/O specifications | Input signals | 7 signals<br>• Single measurement input (TRIG)<br>• Control command input (IN0 to IN5) |
| | Output signals | 3 signals<br>• Control output (BUSY)<br>• Overall judgement output (OR)<br>• Error output (ERROR)<br>**Note:** The assignments of the three output signals (OUT0 to OUT2) can also be changed to the following:<br>• READY • RUN • STG (Strobe trigger)<br>• OR0 (Item0 judgement) to OR31 (Item31 judgement) • Exp.0 judgement to Exp.31 judgement |
| | Ethernet specifications | 100Base-TX/10Base-T |
| | Communications | Ethernet TCP no-protocol, Ethernet UDP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, PLC Link, or PROFINET |
| | I/O expansion | Possible by connecting FQ-SDU1_ Sensor Data Unit. 11 inputs and 24 outputs |
| | RS-232C | Possible by connecting FQ-SDU2_ Sensor Data Unit. 8 inputs and 7 outputs |
| Ratings | Power supply voltage | 21.6 to 26.4 VDC (including ripple) |
| | Current consumption | 2.4 A max. |
| Environmental immunity | Ambient temperature range | Operating: 0 to 40°C, Storage: -25 to 65°C (with no icing or condensation) |
| | Ambient humidity range | Operating and storage: 35% to 85% (with no condensation) |
| | Ambient atmosphere | No corrosive gas |
| | Vibration resistance(destruction) | 10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions 8 min each, 10 times |
| | Shock resistance(destruction) | 150 $m/s^2$ 3 times each in 6 direction (up, down, right, left, forward, and backward) |
| | Degree of protection | IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted or connector cap is removed.) |
| Materials | | Sensor: PBT, PC, SUS, Mounting Bracket: PBT, Polarizing Filter Attachment: PBT, PC<br>Ethernet connector: Oil-resistance vinyl compound, I/O connector: Lead-free heat-resistant PVC |
| Weight | | Narrow View/Standard View:Approx.160 g Wide View:Approx.150 g |
| Accessories included with sensor | | Mounting Bracket (FQ-XL) (1), Polarizing Filter Attachment (FQ-XF1) (1), Instruction Manual, Member Registration Sheet |
| LED class | | Risk Group 2 (IEC 62471) |
| Applicable standards | | EC Directive No.2004/108/EC and EN standard EN 61326-1 |

## Related Manuals

| Man.No. | Model number | Manual |
|---|---|---|
| Z337 | FQ2-S1/S2/S3/S4/CH | Smart Camera FQ2-S/CH Series User's manual |
| Z338 | FQ2-S1/S2/S3/S4/CH | Smart Camera FQ2-S/CH Series User's manual (Communication Settings) |

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Smart Camera

# The High End of OMRON Tracing Products That Operates as a Code Reader or OCR and Also Performs Inspections

Smart Camera
FQ2-S4 Series

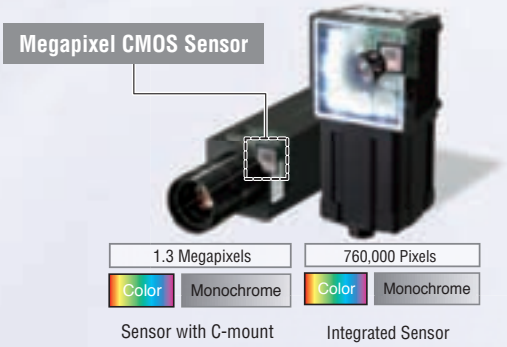
## A Complete Range of Top-end Functions

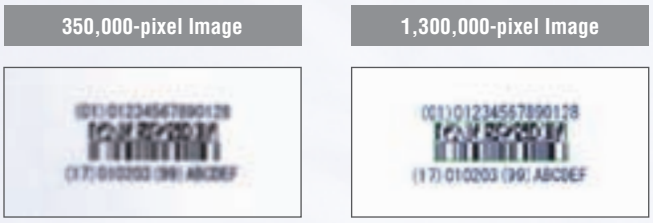
A complete set of functions for stable reading even with low contrast or shiny surfaces along with high-demand communications interfaces. Printed character checking, Bar Code checking, packaging condition inspections, and much more with just one Smart Camera.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Code Reader | High-speed image processor | Megapixel capacity | Real color | Monochrome | C -mount | 9 inspection items | 11 image filters | 32 -camera expansion | 360° position compensation | Ultra-wide field of view | DAP partial input |
| OCR | HDR | Sub-pixel processing | High-power lighting | IP67 | E-IP | PLC Link | FINS | 34 I/O points | RS-232C | Password | Image inversion |

## Reads both Codes and Characters in One View with 1.3 Megapixels

It is generally said that a resolution of 700,000 pixels or higher is required to read both codes and characters in one field of view. The FQ2-S4 Series includes 760,000-pixel models with built-in lighting as well as 1,300,000-pixel models with C-mounts for a flexible selection of fields of view so you can stably read information-heavy codes with one read image.

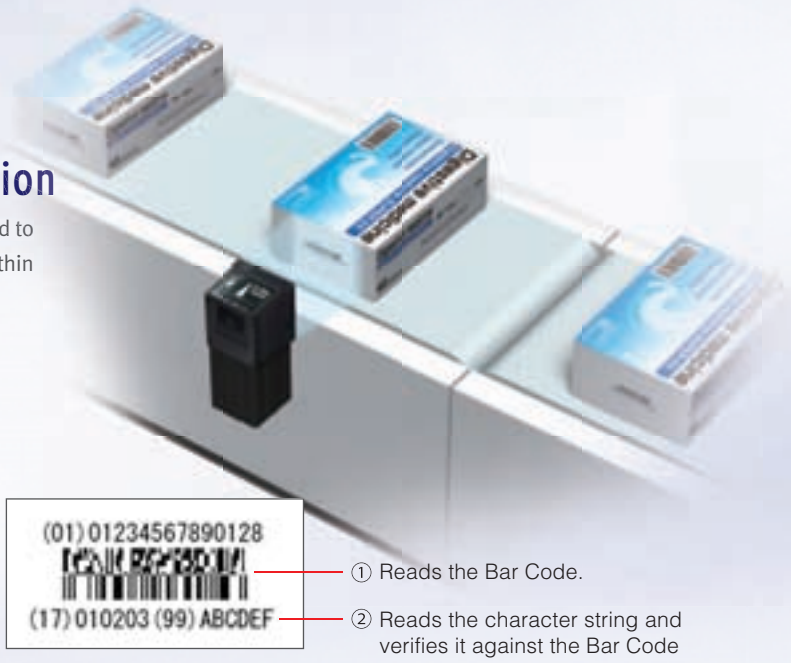


# Code and Character Verification

OCR and Code Reading inspection items can be combined to read codes and verify them against character strings all within the FQ2. No programming of external devices is required.

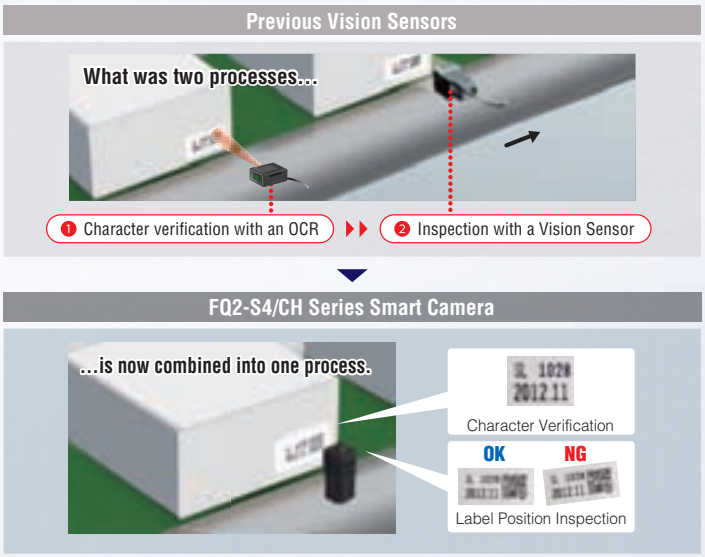
| Measurement Flow | Purpose |
|---|---|
| Position Compensation | Compensates for the position of the box. |
| Reading | |
| ① Bar Code | ① Reads the Bar Code. |
| ② OCR | ② Reads the character string and verifies it against the Bar Code in ①. |
| Outputs | |
| Data | Outputs the verified character string. |


(01) 01234567890128
(17) 010203 (99) ABCDEF
① Reads the Bar Code.
② Reads the character string and verifies it against the Bar Code

# Character Verification and Label Position Inspection

Although previously performed as separate processes, character verification and inspections can now both be performed with one FQ2 Sensor. This helps you reduce costs and save space.

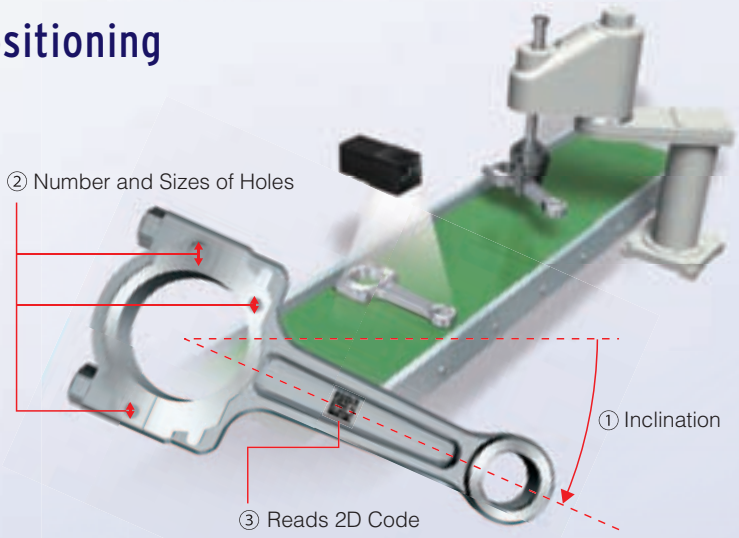
| Measurement Flow | Purpose |
|---|---|
| Image Filters | Adjusts the image so that it is easier to inspect. |
| Position Compensation | Compensates for the position of the box. |
| Inspections | |
| ① OCR | ① Reads the lot number and date. |
| ② Search | ② Label position inspection |
| Calculations and Outputs | |
| Individual Judgement Output | Outputs the judgements of ① and ②. |




# Code Reading and Component Positioning

The Sensor can measure angles of rotation and other position information, so it can also be used for positioning. Inspections can also be performed for the number and size of holes along with the position information.

| Measurement Flow | Purpose |
|---|---|
| Image Filters | Adjusts the image so that it is easier to inspect |
| Inspections and Measurements | |
| ① Shape Search II | ① Component incline and position |
| ② Labeling | ② Number of holes and hole sizes |
| ③ 2D-code(DPM) | ③ Reads 2D Code |
| Calculations and Outputs | |
| Calculation | Calculates data for external output. |
| Data Output | Outputs the position information and incline. |



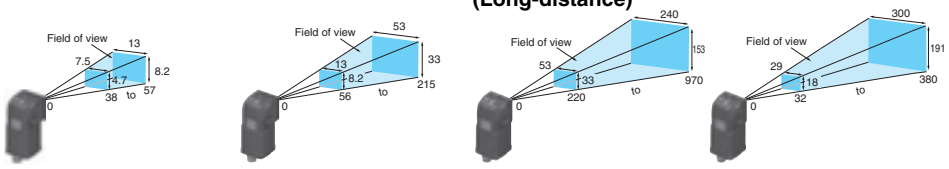
# Ordering Information

## Smart Camera

(Unit: mm)

### [Standard Type]

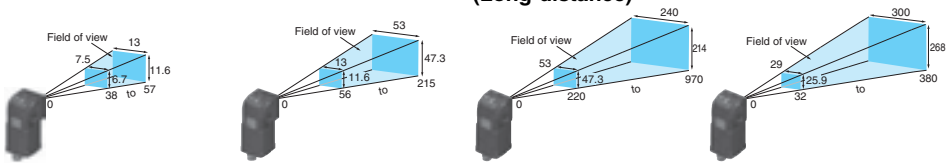
Narrow View / Standard / Wide View (Long-distance) / (Short-distance)




| Field of view | | Narrow View | Standard View | Wide View (Long-distance) | Wide View (Short-distance) |
|---|---|---|---|---|---|
| Number of pixels | | 350,000 pixels | | | |
| Color | NPN | FQ2-S40010F | FQ2-S40050F | FQ2-S40100F | FQ2-S40100N |
| | PNP | FQ2-S45010F | FQ2-S45050F | FQ2-S45100F | FQ2-S45100N |
| Monochrome | NPN | FQ2-S40010F-M | FQ2-S40050F-M | FQ2-S40100F-M | FQ2-S40100N-M |
| | PNP | FQ2-S45010F-M | FQ2-S45050F-M | FQ2-S45100F-M | FQ2-S45100N-M |

### [High-resolution Type]

Narrow View / Standard / Wide View (Long-distance) / (Short-distance)




C-mount type needs a lens. Refer to the optical chart on the FQ2 Catalog (Cat. No. Q193).

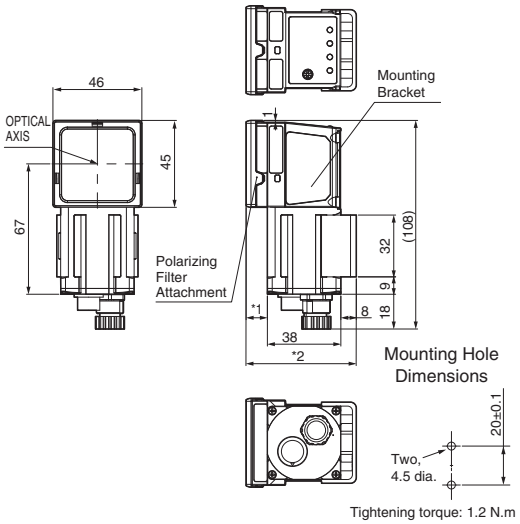
| Field of view | | Narrow View | Standard View | Wide View (Long-distance) | Wide View (Short-distance) | C-mount |
|---|---|---|---|---|---|---|
| Number of pixels | | 760,000 pixels | | | | 1.3 million pixels |
| Color | NPN | FQ2-S40010F-08 | FQ2-S40050F-08 | FQ2-S40100F-08 | FQ2-S40100N-08 | FQ2-S40-13 |
| | PNP | FQ2-S45010F-08 | FQ2-S45050F-08 | FQ2-S45100F-08 | FQ2-S45100N-08 | FQ2-S45-13 |
| Monochrome | NPN | FQ2-S40010F-08M | FQ2-S40050F-08M | FQ2-S40100F-08M | FQ2-S40100N-08M | FQ2-S40-13M |
| | PNP | FQ2-S45010F-08M | FQ2-S45050F-08M | FQ2-S45100F-08M | FQ2-S45100N-08M | FQ2-S45-13M |

Refer to the FQ2 Smart Camera Catalog (Cat. No. Q193) for other devices.

# Dimensions

(Unit: mm)

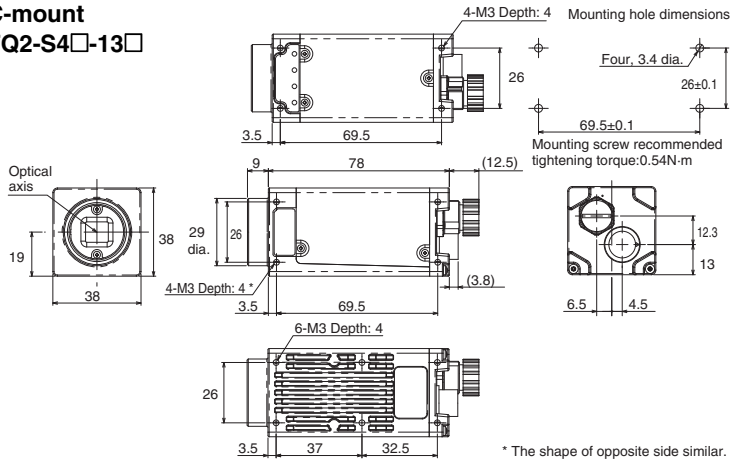
### Integrated Sensor
### FQ2-S4□□□□□□ (-□□□)




✻ Dimentions with the Mounting Bracket

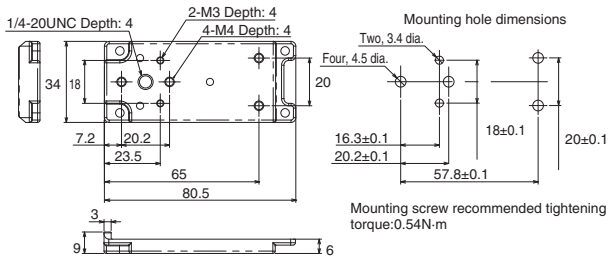
| Type | Model | Note 1. | Note 2. |
|---|---|---|---|
| Narrow View, Standard | FQ2-S4□010F (-□□□)<br>FQ2-S4□050F (-□□□) | 11 | 57 |
| Wide View | FQ2-S4□100F (-□□□)<br>FQ2-S4□100N (-□□□) | 3 | 49 |

### C-mount
### FQ2-S4□-13□




* The shape of opposite side similar.

### Mounting Base
### FQ-XLC
### (included with Sensor)



# Ratings and Performance

## Sensor [Inspection/ID Model FQ2-S4 Series]

| Item | | Inspection/ID Model | | | | | |
|---|---|---|---|---|---|---|---|
| Model | NPN | FQ2-S40□□□□ | FQ2-S40□□□□-M | FQ2-S40□□□□-08 | FQ2-S40□□□□-08M | FQ2-S40-13 | FQ2-S40-13M |
| | PNP | FQ2-S45□□□□ | FQ2-S45□□□□-M | FQ2-S45□□□□-08 | FQ2-S45□□□□-08M | FQ2-S45-13 | FQ2-S45-13M |
| Field of view | | Refer to Ordering Information on p.22. (Tolerance (field of view): ±10% max.) | | | | Select a lens according to the field of view and installation distance. Refer to the optical chart on the FQ2 Catalog (Cat. No. Q193). | |
| Installation distance | | | | | | | |
| Main functions | Inspection items | Search, shape search II, sensitive search, area, color data, edge position, edge pitch, edge width, labeling, OCR *1, Bar code *2, 2D-code *2, 2D-code(DMP) *3, and Model dictionary | | | | | |
| | Number of simultaneous measurements | 32 | | | | | |
| | Position compensation | Supported (360º Model position compensation, Edge position compensation, Linear correction) | | | | | |
| | Number of registered scenes | 32 *4 | | | | | |
| | Calibration | Supported | | | | | |
| | Retry function | Normal retry, Exposure retry, Scene retry, Trigger retry | | | | | |
| Image input | Image processing method | Real color | Monochrome | Real color | Monochrome | Real color | Monochrome |
| | Image filter | High dynamic range (HDR), image adjustment(Color Gray Filter, Weak smoothing, Strong smoothing, Dilate, Erosion, Median, Extract edges, Extract horizontal edges, Extract vertical edges, Enhance edges, Background suppression), polarizing filter (attachment), and white balance (Sensors with Color Cameras only), Brightness Correction | | | | | |
| | Image elements | 1/3-inch color CMOS | 1/3-inch Monochrome CMOS | 1/2-inch color CMOS | 1/2-inch Monochrome CMOS | 1/2-inch color CMOS | 1/2-inch Monochrome CMOS |
| | Shutter | Built-in lighting ON: 1/250 to 1/50,000 s<br>Built-in lighting OFF: 1/1 to 1/50,000 s | | Built-in lighting ON: 1/250 to 1/60,000 s<br>Built-in lighting OFF: 1/1 to 1/4,155 s | | 1/1 to 1/4,155 s | |
| | Processing resolution | 752 × 480 | | 928 × 828 | | 1280 × 1024 | |
| | Partial input function | Supported horizontally only. | | Supported horizontally and vertically | | | |
| | Image display | Zoom-in/Zoom-out/Fit, Rotating by 180º | | | | | |
| | Lens mounts | --- | | | | C-mount | |
| Lighting | Lighting method | Pulse | | | | --- | |
| | Lighting color | White | | | | --- | |
| Data logging | Measurement data | In Sensor: 1,000 items (If a Touch Finder is used, results can be saved up to the capacity of an SD card.) | | | | | |
| | Images | In Sensor: 20 images (If a Touch Finder is used, images can be saved up to the capacity of an SD card.) | | | | | |
| Auxiliary function | | Statistical data, Test Measurements, I/O monitor, Password function, Simulation software, Sensor error history, Calibration, Math (arithmetic, calculation functions, trigonometric functions, and logic functions) | | | | | |
| Measurement trigger | | External trigger (single or continuous)<br>Communications trigger (Ethernet TCP no-protocol, Ethernet UDP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, PLC Link, or PROFINET) | | | | | |
| I/O specifications | Input signals | 7 signals<br>• Single measurement input (TRIG)<br>• Control command input (IN0 to IN5) | | | | | |
| | Output signals | 3 signals<br>• Control output (BUSY)<br>• Overall judgement output (OR)<br>• Error output (ERROR)<br>**Note:** The assignments of the three output signals (OUT0 to OUT2) can also be changed to the following:<br>• READY • RUN • STG (Strobe trigger)<br>• OR0 (Item0 judgement) to OR31 (Item31 judgement) • Exp.0 judgement to Exp.31 judgement | | | | | |
| | Ethernet specifications | 100Base-TX/10Base-T | | | | | |
| | Communications | Ethernet TCP no-protocol, Ethernet UDP no-protocol, Ethernet FINS/TCP no-protocol, EtherNet/IP, PLC Link, or PROFINET | | | | | |
| | I/O expansion | Possible by connecting FQ-SDU1_ Sensor Data Unit. 11 inputs and 24 outputs | | | | | |
| | RS-232C | Possible by connecting FQ-SDU2_ Sensor Data Unit. 8 inputs and 7 outputs | | | | | |
| Ratings | Power supply voltage | 21.6 to 26.4 VDC (including ripple) | | | | | |
| | Current consumption | 2.4 A max. | | | | 0.3 A max. | |
| Environmental immunity | Ambient temperature range | Operating: 0 to 40ºC, Storage: -25 to 65ºC<br>(with no icing or condensation) | | | | | |
| | Ambient humidity range | Operating and storage: 35% to 85% (with no condensation) | | | | | |
| | Ambient atmosphere | No corrosive gas | | | | | |
| | Vibration resistance (destruction) | 10 to 150 Hz, single amplitude: 0.35 mm, X/Y/Z directions<br>8 min each, 10 times | | | | | |
| | Shock resistance (destruction) | 150 m/s$^2$ 3 times each in 6 direction (up, down, right, left, forward, and backward) | | | | | |
| | Degree of protection | IEC 60529 IP67 (Except when Polarizing Filter Attachment is mounted or connector cap is removed.) | | | | IEC 60529 IP40 | |
| Materials | | Sensor: PBT, PC, SUS<br>Mounting Bracket: PBT<br>Polarizing Filter Attachment: PBT, PC<br>Ethernet connector: Oil-resistance vinyl compound<br>I/O connector: Lead-free heat-resistant PVC | | | | Cover: Zinc-plated steel, Thickness: 0.6 mm<br>Case: Aluminum diecast alloy (ADC-12)<br>Mounting base: Polycarbonate ABS | |
| Weight | | Narrow View/Standard View:Approx.160 g<br>Wide View:Approx.150 g | | | | Approx. 160 g without base,<br>Approx. 185 g with base | |
| Accessories included with sensor | | Mounting Bracket (FQ-XL)(1)<br>Polarizing Filter Attachment (FQ-XF1) (1)<br>Instruction Manual, Member Registration Sheet | | | | Mounting Base (FQ-XLC) (1)<br>Mounting Screw (M3 × 8mm)(4)<br>Instruction Manual, Member Registration Sheet | |
| LED class | | Risk Group 2 (IEC 62471) | | | | --- | |
| Applicable standards | | EC Directive No.2004/108/EC and EN standard EN 61326-1 | | | | | |

**✻1.** The types of characters to be read are the same as those of FQ2-CH Optical Character Recognition Sensor (p.19).
**✻2.** The types of cedes to be read are the same as those of FQ-CR1 Multi Code Reader (p.15).
**✻3.** The types of cedes to be read are the same as those of FQ-CR2 2D Code Reader (p.15).
**✻4.** Depending on the settings, the number of scenes that can be registered is reduced due to memory restrictions.

## Related Manuals

| Man.No. | Model number | Manual |
|---|---|---|
| Z337 | FQ2-S1/S2/S3/S4/CH | Smart Camera FQ2-S/CH Series User's manual |
| Z338 | FQ2-S1/S2/S3/S4/CH | Smart Camera FQ2-S/CH Series User's manual (Communication Settings) |

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CSM_12_2_0815 Printed in Japan
**Cat. No. Q195-E1-01** 0313(0313)